

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
SAN FRANCISCO BAY REGION

ORDER NO. 96-102

ADOPTION OF SITE CLEANUP REQUIREMENTS FOR:

USX Corporation
Bay West Cove, LLC

for the property located at

Shearwater Site
Oyster Point Blvd.
South San Francisco, CA

The California Regional Water Quality Control Board, San Francisco Bay Region (hereinafter Board), finds that:

1. **Site Location:** The Shearwater site is located in South San Francisco at Oyster Point Boulevard (Figure 1). The site has no street address and is identified as San Mateo County Assessor's Parcel Numbers 015-101-010 and 015-010-150. The total area of the site is 166.90 acres, including approximately 47 acres onshore and 120 acres offshore (Figure 2). The offshore acreage (part of San Francisco Bay) includes the launch basin (or "slot") which is about 7 acres in size. The property is bounded to the west by the CalTrain right-of-way, to the south by Oyster Point Boulevard, to the east by property owned by the DiSalvo Company, and to the north by undeveloped baylands.
2. **Site History:** From 1938 to 1978, the site was operated by U. S. Steel Corporation, a subsidiary of USX Corporation, and used for steel and pipe fabrication and assembly. Liberty ships were built and repaired there for a time in the early to mid 1940s. Toxic chemicals used during these operations included lead-based primer and paint, anti-fouling paints, acids, and various petroleum products. Above and below ground fuel storage tanks were used, as were several electrical transformers.

The site is currently owned by Bay West Cove, LLC which purchased the site from Epoch Development Company, Ltd, successor to Sumitomo Development Company, Ltd. in 1996. The property was initially sold by U. S. Steel to Neville and Rosemary Price on September 19, 1984. A deed of trust was issued to Industrial Indemnity Company by the Prices at that time. The property was sold at public auction to Industrial Development on March 24, 1987. Industrial Indemnity Company assigned and transferred the property to Diodati Properties on September 8, 1989, who

immediately assigned the property to Sumitomo Development Partners.

All site buildings and related structures were removed by the mid to late 1980s in anticipation of site redevelopment activities. Currently, the site is characterized by an irregular, randomly graded land surface. Depressions resulting from grading and other construction activities have allowed the temporary ponding of water in several areas. These areas and others may be potential jurisdictional wetlands and waters of the United States and subject to federal jurisdiction under Section 404 of the Clean Water Act. A delineation performed by the Army Corps of 1986 at the site found 1.5 acres of wetlands within the project area. It is unclear exactly how many acres of wetlands/waters of the U.S. that currently exist and will be identified as jurisdictional. A request by Bay West Cove LLC has been submitted to the Army Corps of Engineers requesting a final determination of the number of acres that are considered as jurisdictional and may require mitigation due to their destruction as part of the necessary remedial activities.

The shoreline is defined by rotting piles and pier materials and randomly sized rusting metal debris. In many areas, the stability of the shoreline appears to be compromised and threatened by the continuing decay of the piles and supporting timbers.

3. **Named Dischargers:** Five environmental studies have been performed at the Shearwater site (Site) since 1984, which have identified soil, groundwater, and sediment pollution. A wide variety of chemicals have been detected including the following: total petroleum hydrocarbons as diesel (TPH-d), total petroleum hydrocarbons as motor oil (TPH-mo), heavy metals (most notably lead up to 57,000 ppm), low levels of volatile organic constituents (VOCs), poly-aromatic hydrocarbons (PAHs), and polychlorinated biphenyls (PCBs). The primary chemicals of concern are lead and total petroleum hydrocarbons (TPH) onshore, and various heavy metals (most notably lead), TPH, PAHs, and PCBs offshore.
 - a. USX Corporation is considered a discharger because they owned and operated the former steel manufacturing facility which caused the discharge of chemicals which threaten to cause or have contributed to soil and groundwater pollution on site as well as the sediments offshore adjacent to the former facility.
 - b. Bay West Cove, LLC is considered a discharger because they are the current property owner. Bay West is considered secondarily liable because they have not threatened to cause or contributed to the current soil, groundwater, and sediment pollution.

Although Bay West Cove, LLC is considered secondarily liable, they will be taking the lead role in the cleanup of the site in order to facilitate an aggressive cleanup of the site so it can be developed as soon as possible. Therefore, U.S.X. Corporation will be responsible for compliance only if 1) the Executive Officer finds that Bay West

Cove LLC has failed to comply with the requirements of this order or 2) in the event that Bay West Cove, LLC chooses to relinquish the lead role in performing the required cleanup and is acceptable to the Executive Officer.

If additional information is submitted indicating that other parties caused or permitted any waste to be discharged on the site where it entered or could have entered waters of the state, the Board will consider adding that party's name to this order as a discharger.

4. **Regulatory Status:** This site is currently not subject to Board order but will be subject to regulatory authority of other agencies such as Army Corps of Engineers, Bay Conservation and Development Commission, and others for the permits necessary for the required remedial activities such as dredging and wetland issues. (Adoption of this Order does not satisfy the requirements for the CWA 404 Permit or certification.)
5. **Site Hydrogeology:** The site is essentially flat, having been rough-graded after the buildings and related structures were demolished in the 1980's. A natural topographic high exists in the southeastern portion of the site along Oyster Point Boulevard, and numerous mounds of soil and concrete/asphalt debris exist across the site. Shallow depressions caused by site grading and building demolition occur across the site.

The site is underlain by 2 to 5 feet of fill material composed of sand, gravel, varying amounts of clay, and miscellaneous debris. In many areas the fill is overlain by pavement and concrete pads not removed during demolition. The fill is generally underlain by bay mud which ranges in thickness from 0 to 23 feet thick. In the vicinity of the topographic high in the southeastern portion of the site along Oyster Point Boulevard, the fill is underlain by stiff clay, silty sand, and dense sand.

Groundwater elevations as measured on 31 August 1995 ranged from 10.5 to 2.5 feet above mean sea level. The depth to groundwater is approximately 5 to 6 feet below ground surface, except in the southeastern corner of the site where groundwater is approximately 10 feet below ground surface. Groundwater flow is towards the bay at a gradient of 0.005 to 0.006.

6. **Remedial Investigation:** Soil pollution is found across the site with the greatest concentrations in the upper two feet of soil. Chemical concentrations generally decrease by one to two orders of magnitude in soil two to four feet below ground surface. Elevated concentrations of various metals, including lead, chromium, and nickel are found in the soil, although only lead occurs at significantly high levels. Total lead concentrations in soil range upwards to 57,000 mg/kg; however, soluble lead concentrations are quite low. Soluble lead analyses using the Toxic Characteristic Leaching Procedure (TCLP) failed to indicate any lead concentrations exceeding the TCLP limit of 5 mg/L the hazardous waste criteria.

Total petroleum hydrocarbons as diesel (TPH-d) and motor oil (TPH-mo) are found in shallow soil throughout the site. TPH-mo is the predominant hydrocarbon, occurring at concentrations of up to 30,000 mg/kg. TPH concentrations are highest in the top two feet of soil, significantly decreasing in concentration below two feet. In addition to TPH, there has been low levels of benzene, toluene, ethylbenzene, and xylene (BTEX) detected in a soil sample collected during the installation of MW-8. However, the levels detected are less than 1 ppm and do not appear to pose a significant threat to human health or the underlying groundwater.

There is not significant soil pollution by poly-aromatic compounds (PAHs). Polychlorinated biphenyls (PCBs) were detected within the southeastern portion of the property in the vicinity of the former acid sewer/ storm water outfall. The concentrations range from ND to 69 mg/kg at three feet below grade. The lateral extent appears to be limited.

Offshore sediment in both the launch basin and formerly dredged channel is polluted with the following: PNAs; PCBs as Aroclor 1254; metals including cadmium, lead, mercury, arsenic, chromium, copper, nickel, and zinc; tributyltin; total recoverable petroleum hydrocarbon. The significant chemicals of concern, based on concentrations, are total lead, Aroclor 1254, PNAs, TPH, and selenium. Bioassays performed on sediment from the vicinity of the storm water discharge pipe indicate that sediment in that area is highly toxic to marine life, and that sediment from the formerly dredged channel may be toxic in certain areas.

Groundwater does not appear to be adversely impacted. No semi-volatile compounds were detected, and only one volatile organic compound, perchloroethylene, was found once at 8 ug/l. Total extractable hydrocarbons as diesel ranged from nondetect to 3.2 mg/l, and total extractable hydrocarbons as motor oil ranged from nondetect to 0.5 mg/l. Metal concentrations were low, with lead nondetected at all but one well where total lead was found at 0.005 mg/l. Arsenic ranged from nondetected to 0.26 mg/l.

A Conceptual Remedial Action Plan (RAP) was submitted by Treadwell & Rollo, Inc. on behalf of Bay West Cove, LLC on February 28, 1996. In addition to presenting onshore soil, offshore sediment, and groundwater data collected in 1995, the RAP provided a summary of the previous site characterization work performed by Brown & Caldwell in 1984, Dames & Moore in 1988, and Treadwell & Associates in 1990. Sediment sampling and analysis work performed by MEC Analytical Systems, Inc. was also summarized.

7. **Adjacent Sites:** The surrounding area has historically been utilized for heavy industrial activities and has recently been converted to commercial mixed use, research and development, and ancillary facilities. A large child care facility (250 children, ages 6 weeks to 6 1/2 years) is located within 500 feet of the southern boundary of the site. Additionally, there are hotels and restaurants in the vicinity. Many of the

historical activities have lead to both soil and groundwater impacts on the sites located within the vicinity. Of the identified sites, there are two worthy of discussion; a) Homart Development and b) Highway 101 Oyster Point Drainage Culvert.

a. Homart Development / Former Edwards Wire and Rope Facility

The Homart Development is located immediately south of the site across Oyster Point Blvd. This is the site of the former Edwards Wire and Rope facility which was found to contain elevated heavy metals, primarily lead, in both soil and groundwater. The groundwater was also found to have very acidic conditions (down to a pH of 2). The site was remediated in the late 1980's. However, elevated levels of lead in the groundwater have been detected in the southwest corner of the Shearwater parcel (down gradient of the Homart Site) that may be attributable to the past onsite releases.

b. Highway 101 Oyster Point Drainage Culvert.

In addition to the Homart Development site to the south, there is a segment of Highway 101 to the west of the Shearwater site that has been identified as containing lead-impacted soils and groundwater. The soils have been removed as part of the freeway drainage realignment in 1992/93 under the oversight of the Department of Toxic Substances Control; as of 1993 the groundwater still contained very elevated levels of lead (up to 21,000 ppb). It is unclear what the source of the lead is at this time. Possible sources of the lead include the former U.S. Steel facility which is not included within the Shearwater Development area (the Site), drainage from the Homart Development from past operations at the former Edwards Wire and Rope facility, or leaded gasoline from the cars driving on Highway 101. Although the groundwater within this area is still considered a water quality problem at this time, it will not be addressed within this Order since it is outside of the Shearwater parcel.

8. **Interim Remedial Measures:** No interim remedial measures have been implemented at the site, with the exception of soil removal at the property immediately adjacent to the southwestern property boundary. This property was used for the construction of the Oyster Point Boulevard overpass structure, constructed by CalTrans. Approximately 5,000 cubic yards of soil were excavated and properly disposed of offsite prior to the overpass construction.

9. **Risk Assessment:**

a. Human Health Assessment

Either 1) a site specific health risk assessment or 2) a comprehensive health and safety plan will be required by Task 1 of this Order. The purpose of the Task 1 is ensure adequate protection of on and off site receptors during and after remedial activities.

Option 1: A site specific health risk assessment must be completed prior to the approval of a remedy for the site and prior to initiation of remediation or construction activities at the site as required by Task 2. The site specific risk assessment must evaluate: 1) whether an exposure pathway exists; and if such an exposure pathway exists then , 2) the quantitative risks to human health and safety, including human health considerations with the potential of affecting the offsite receptors. The site specific risk assessment must separately analyze risk in relation to remediation and construction activities, post construction surface conditions (i.e. filled or paved surfaces and shallow subsurfaces), and post construction residual pollutants that will remain onsite after the completion of the preliminary remedial action plan described within Findings 10 and 11 of this Order.

Compliance with Preliminary Remediation Goals (PRGs) for industrial areas shall not be deemed a satisfactory method of completing the required risk assessment for remediation and construction activities, post construction surface conditions (i.e. 2 to 3 foot of clean fill material), or post construction residual pollution conditions with a potential to migrate through the cap (i.e. volatile organic compounds). Compliance with PRGs for residential areas (as adjusted for California) shall be deemed to be a satisfactory method of completing the required risk assessment for post construction surface conditions (i.e. the clean fill materials) and post construction residual pollution conditions with the potential to migrate through the cap (i.e. volatile organic compounds). If soil concentrations for the cap exceed the residential PRGs, and are deemed by the Board to be above naturally occurring levels within the Bay Area, then a compound-specific risk assessment will be provided that demonstrates the acceptability of the material.

Option 2: In lieu of preparing a risk assessment for remediation and construction activities the Discharger may prepare a comprehensive health and safety plan for construction activities that meet the following substantive criteria by ensuring that there is: 1) no offsite migration of pollutants (including but not limited to airborne dust) during remedial construction activities as defined in the monitoring program within the approved health and safety plan; 2) a monitoring system with high volume sampling equipment, capable of detecting low levels of metals and particulate matter, for ensuring compliance with the no offsite migration requirements; and 3) a contingency plan, including notification and corrective action requirements, in the event offsite migration occurs notwithstanding these health and safety plan measures.

Compliance with Preliminary Remediation Goals (PRGs) for industrial areas shall not be deemed a satisfactory method of completing the required risk assessment for remediation and construction activities, post construction surface conditions (i.e. 2 to 3 foot of clean fill material), or post construction residual pollution conditions with a potential to migrate through the cap (i.e. volatile organic compounds). Compliance with PRGs for residential areas (as adjusted for California) shall be deemed to be a satisfactory method of completing the required risk assessment for post construction

surface conditions (i.e. the clean fill materials) and post construction residual pollution conditions with the potential to migrate through the cap (i.e. volatile organic compounds). If soil concentrations for the cap exceed the residential PRGs, and are deemed by the Board to be above naturally occurring levels within the Bay Area, then a compound-specific risk assessment will be provided that demonstrates the acceptability of the material.

For either the risk assessment or the health and safety plan, the following procedure must be utilized: 1) interested parties must be consulted in preparing drafts of the risk assessment, health and safety plan, and contingency plan (as applicable); 2) a completed draft risk assessment or health and safety plan must be made available for additional review and comment by interested parties; and 3) final remedy approval and site construction activities may not occur until after final approval of the risk assessment or health and safety plan by the Executive Officer.

For comparison, the Board considers the following risks to be acceptable at remediation sites: a cumulative hazard index of 1.0 or less for non-carcinogens, an excess individual chemical cancer risk of not greater than 10^{-5} , and a cumulative excess cancer risk of 10^{-4} or less for carcinogens for most sites and an excess individual chemical cancer risk of not greater than 10^{-6} , and a cumulative excess cancer risk of 10^{-5} or less for carcinogens at highly sensitive receptor locations such as child care facilities.

b. Ecological Assessment

In order to assess the adverse impacts of the pollutants discharged from the site to the organisms living in the adjacent offshore sediments, a series of sediment cores were collected and analyzed for a comprehensive suite of chemicals including: arsenic, cadmium, chromium, lead, mercury, nickel, selenium, silver, zinc, organotins, total petroleum hydrocarbons, pesticides, polychlorinated biphenyls, polynuclear aromatic hydrocarbons, and phthalate esters. Four separate sampling rounds were performed, beginning in 1987. A total of 97 sediment cores have been collected and analyzed within the sub-tidal portion of the property. The 1995 sediment testing was performed within the guidelines provided in the Testing Manual for the Evaluation of Dredged Material Proposed for Ocean Disposal (U.S. Environmental Protection Agency (EPA)/ Army Corps of Engineers (ACOE), 1991, and the testing guidelines established by ACOE, RWQCB, Bay Conservation and Development Commission (BCDC), and the U.S. EPA in PN 93-2 (1993)).

The stratigraphic distribution of chemical pollutants was examined to determine whether the chemicals detected were located in the upper sediments where they could potentially be bioavailable to organisms. Based upon the distribution of the sediment chemistry, it became apparent that the deeper sediments (6 to 9 feet below sediment surface) were more heavily polluted than the upper sediments with the exception of the

launch basin and the former acid sewer/ storm water outfall. While the deeper sediments were found to contain higher levels of heavy metals such as lead, the upper sediments frequently had higher levels of organic compounds such as PCBs and PNAs. Lead, total petroleum hydrocarbons, selenium, PCBs, and PNAs were found to be the most predominant chemicals of concern detected within the sediments. Lead concentrations have been detected within the sediments as high as 2,610 ppm, well in excess of benchmark concentrations such as NOAA's Effects Range Median Level (218 ppm) the level at which toxic effects to aquatic species are expected to occur. Other chemicals of potential concern include cadmium, mercury, silver, selenium, zinc, and cyanide.

Based upon the results of the chemical analyses, a subset of the sediment cores were selected for biological testing. Both suspended particulate phase (elutriate) and 10 day solid phase bioassays were performed according to ASTM protocol. The suspended particulate bioassay test was performed on the bay mussel, *Mytilus edulis*, and the purple sea urchin, *Strongylocentrotus purpuratus*, to estimate the potential impact of solubilization of pollutants on the organisms that live within the water column. Both tests were conducted using larval stages of the organisms to attempt to predict the effects at a critical life stage. The solid phase bioassay was performed on the amphipod, *Ampelisca abdita*, to determine the impact of the chemicals contained within the sediment. A total of fourteen bioassays were conducted for the offshore sediments. Both amphipod survival and mussel development endpoints were examined.

The cores selected for the bioassays were from both the upper and lower portions of the sediment test cores to determine a correlation between toxicity and depth. The samples also contained various chemical constituents with varied concentrations. The bioassays showed higher mortality (up to 100%) in the lower sediments which was consistent with the trend in the chemical contaminant distribution. The highest mortality in the upper sediments occurred in the sediment sample collected in front of the former acid sewer outfall.

Based upon the elevated chemical concentrations detected and bioassay results (less than 80% survival or normal development compared to laboratory controls for the species tested), there is a clear indication that the sediments in their current state pose a threat to the organisms within the former ship channel and the former acid sewer/ storm water . The risk to the aquatic environment is not acceptable and corrective measures must be taken.

c. Long Term Risk Management

Due to excessive risk that will be present at the site pending full remediation and the long term management and monitoring that will be required, institutional constraints are appropriate to limit on-site exposure to acceptable levels. Institutional constraints

include a deed restriction that notifies future owners of areas of sub-surface pollution and prohibits the use of shallow groundwater beneath the site, requires subsequent owners to maintain the site cap remedy identified in this Order, requires subsequent excavation or construction activity that disturbs the cap to be performed in compliance with a post-remediation health and safety plan, requires advance notification to interested parties of any onsite activities that will cause a potential breach of the cap, and prohibits the disturbance of the offshore sediments.

10. **Feasibility Study:** *The following remedial options were considered for soil treatment as described within the Conceptual Remedial Action Plan:* 1) no action; 2) encapsulation by pavement and building foundations; 3) hot spot soil removal and fixation with on-site disposal and subsequent cover of the site with 2 - 3 feet of clean fill, followed by paving; 4) hot spot excavation and off-site disposal followed by cover with fill and pavement. Option 3, hot spot soil removal and fixation with on-site disposal and cover, was selected by the discharger as the preferred alternative, as it was considered to be protective of the marine environment and human health, and is economically viable. This option includes the removal of the top two feet of soil within the Ecological Protection Zone, followed by capping with fill that is in accordance with Table 4.1, with on-site disposal of the excavated soil and cover in either the southwestern or southeastern corners of the site. Soil with total lead and hydrocarbon concentrations exceeding the applicable cleanup objectives as outlined within Tables 3.1a and 3.2 will be excavated, fixated, and encapsulated on site away from the shoreline. The site will then be capped with two to three feet of clean fill over the HHPZ and SEPZ. Clean fill which exceeds residential PRGs and are above background levels will be allowed for the HHPZ if compound-specific risk assessments demonstrate the acceptability of the material. The discharger shall consult with interested parties in identifying the source(s) and characteristics of the proposed fill, and regarding the acceptability from a risk perspective, of the concentrations naturally occurring in the Bay Area in evaluating the proposed fill material. Board staff concur with the proposed alternative.

Alternative options for remediating polluted sediment included: 1) no action; 2) dredging and off-site disposal; 3) dredging and on-site disposal; 4) spot dredging with on-site disposal and cover of the dredged area and undredged sediment in the launch basin with clean fill; 5) cover of the polluted sediment with clean fill. Option 4 was selected by the discharger as being protective of the environment and economically viable. The selected remedial alternative includes dredging the top polluted sediment from the area of the acid waste sewer/storm water discharge outfall and formerly dredged channel, emplacement of the sediment in the back of the launch basin, and cover of the dredged area and entire launch basin with two to three feet of clean coarse sand and gravel with chemistry in accordance with the "Sediment Screening Criteria and Testing Requirements for the Creation of Upland Beneficial Reuse". The launch basin will in turn be filled as a wetland, providing additional isolation of the contaminated sediments. Board staff concur with the proposed alternative.

11. **Cleanup Plan:** The proposed site cleanup plan as outlined within the Conceptual Remedial Action Plan will include three components. These are: 1) soil remediation via spot removal, fixation, re-emplacement and cover of the entire site with two to three feet of clean fill; 2) sediment remediation via spot dredging, disposal in the launch basin, and cover of the sediment in the launch basin and in dredged areas outside the launch basin with two to three feet of sand and gravel; 3) construction of an appropriate wetland in the launch basin and along the shoreline outside the launch basin. Figure 3 illustrates the draft plan showing the areas to be dredged and wetland area to be created. The final remedial design will be submitted as required under Task 2 of this Order.

Specific health and safety protocols will be required during the site remediation effort to safeguard workers on site and persons offsite who may be impacted by airborne soil pollution. Dredging will be performed using methods which minimize the resuspension of pollutants into the water column, including the use of silt curtains where appropriate.

12. **Basis for Cleanup Standards**

- a. **General:** State Board Resolution No. 68-16, "Statement of Policy with Respect to Maintaining High Quality of Waters in California," applies to this discharge and requires attainment of background levels of water quality, or the highest level of water quality which is reasonable if background levels of water quality cannot be restored. Cleanup levels other than background must be consistent with the maximum benefit to the people of the State, not unreasonably affect present and anticipated beneficial uses of such water, and not result in exceedence of applicable water quality objectives.

State Board Resolution No. 92-49, "Policies and Procedures for Investigation and Cleanup and Abatement of Discharges Under Water Code Section 13304," applies to this discharge. This order and its requirements are consistent with the provisions of Resolution No. 92-49, as amended.

- b. **Wetland Creation Criteria:** "Sediment Screening Criteria and Testing Requirements for Wetland Creation and Upland Beneficial Reuse" as adopted within the 1995 Basin Plan update. This criteria is applicable for the creation of wetlands anticipated as part of the remedial activities. This order is consistent with the requirements of this portion of the Basin Plan.
- c. **Beneficial Uses:** The Board adopted a revised Water Quality Control Plan for the San Francisco Bay Basin (Basin Plan) on June 21, 1995. This updated and consolidated plan represents the Board's master water quality control planning document. The revised Basin Plan was approved by the State Water Resources Control Board and the Office of Administrative Law on July 20, 1995, and

November 13, 1995, respectively. A summary of regulatory provisions is contained in 23 CCR 3912. The Basin Plan defines beneficial uses and water quality objectives for waters of the State, including surface waters and groundwaters.

Board Resolution No. 89-39, "Sources of Drinking Water," defines potential sources of drinking water to include all groundwater in the region, with limited exceptions for areas of high TDS, low yield, or naturally-high contaminant levels. Shallow (A-fill) groundwater underlying and adjacent to the site does not qualify as a potential source of drinking water.

The Basin Plan designates the following potential beneficial uses of groundwater underlying and adjacent to the site:

- o Municipal and domestic water supply *
- o Industrial process water supply
- o Industrial service water supply
- o Agricultural water supply
- o Surface water replenishment

* Based upon data collected at the site, this beneficial use is not applicable to the shallow groundwater in the A-fill zone underlying the site due to high total dissolved solids (greater than 3,000 ppm) as defined by Board Resolution 89-39. However, the deeper groundwater has not been analyzed for total dissolved solids and may still be considered as a potential drinking water source.

The existing and potential beneficial uses of the lower San Francisco Bay include:

- o Industrial process supply or service supply
- o Water contact and non-contact recreation
- o Wildlife habitat
- o Fish migration and spawning
- o Navigation
- o Estuarine habitat
- o Shellfish harvesting
- o Preservation of rare and endangered species

- d. **Basis for Groundwater Cleanup Standards:** The shallow groundwater underlying the site is not considered a potential drinking water source based upon the high total dissolved solids. Therefore, the groundwater cleanup standards for the shallow groundwater underlying the site are based on applicable water quality objectives for the protection of the beneficial uses of

the adjacent surface water receptor, the lower San Francisco Bay. Cleanup to this level with institutional controls will result in acceptable residual risk to humans and the adjacent San Francisco Bay waters.

- e. **Basis for Upland Soil Cleanup Standards:** The upland portion of the site has been divided into two units identified as Remediation Management Zones for soil and groundwater cleanup (See Figure 4). The first zone is identified as a Human Health Protection Zone (HHPZ) which includes the upland portions of the site and the second is identified as a Saltwater Ecological Protection Zone (SEPZ) which encompasses the portion of the site within 100 feet of the bay (Mean High Tide Line).

1) Human Health Protection Zone

The soil cleanup standards for the HHPZ are based upon a) the protection of human health for the future onsite development; b) the protection of human health for existing and future offsite uses; and c) the potential for the pollutants to leach into groundwater and migrate to the bay. A site specific risk assessment will be performed as required under Task 1 of this order and will form the basis for the final soil cleanup objectives. In the event the discharger opts not to perform a site specific risk assessment, the U.S. EPA Preliminary Remediation Goals as adjusted for California will be used as identified within Table 3.1a and Table 3.2 as applicable. In addition, Toxic Characterization Leaching Procedure (TCLP) tests were performed for metals to determine if leaching of the metals from the soil to the groundwater would be anticipated. The results of these tests demonstrated that soils leached no significant concentrations of metals. Therefore, based upon the leachate results and groundwater monitoring, up to 1,000 ppm of lead can remain in onsite soil with no significant impact to the underlying groundwater and adjacent bay waters.

Soil used for capping the site for the HHPZ will meet all applicable U.S. EPA Residential PRGs as adjusted for California (including those specified within Table 3.1b) and the levels for the SEPZ as specified within Table 4.1. If soil concentrations for the cap exceed the residential PRGs, and are deemed by the Board to be above naturally occurring levels within the Bay Area, then a compound-specific risk assessment will be provided that demonstrates the acceptability of the material.

2) Saltwater Ecological Protection Zone

The basis for the SEPZ will be the protection of the aquatic species and other species that inhabit the bay as well as the proposed intertidal wetland that is to be created as part of the site remedial and wetland mitigation activities.

Cleanup to this level is intended to prevent leaching of pollutants to groundwater that will protect both human health (fish consumption) and the environment.

- f. **Basis for Sediment Cleanup Standards:** There are two basic components in developing site specific remedial actions and standards for sediments. The first is to identify areas of concern that pose an unacceptable risk to the aquatic environment and therefore require remediation and/or containment. The second is to establish cleanup objectives for the areas of concern that have been identified.

1. Identification of Areas of Affected Sediment Requiring Remediation/Containment:

Although there are currently no numerical sediment quality criteria for San Francisco Bay, there are national benchmark values available which provide a frame of reference for chemical concentrations which may cause toxicological effects. One set of benchmark values which are commonly used, developed by the National Oceanographic Atmospheric Administration (1993), are known as Effects Range Low (ERLs) and Effects Range Median (ERMs). These values represent a range of chemical concentrations where toxic effects can be predicted. For concentrations below the ERL toxicological effects are rarely observed. For concentrations above the ERL but below the ERM, toxicological effects are occasionally observed, and for concentrations above the ERM toxicological effects are frequently observed. In the absence of regulatory sediment standards, these values in conjunction with biological testing, and consideration of bioaccumulation, will be used to identify areas of concern where remedial work is required.

The following factors must be considered when identifying areas of concern: a) chemical concentration, b) observed toxicity, and c) bioaccumulation/biomagnification. Each of these three factors must be considered independently for each sampling point. Once an area has been identified as a potential area of concern by any one or more of these three factors, then exposure pathway and sediment transport must be examined to determine whether the polluted sediments will come into contact and impact the aquatic organisms.

a) Identification by Chemical Concentration:

First, the concentrations detected for each individual chemical of concern are compared against their respective chemical effects concentrations. For sediments that are below NOAA's Effects Range Low (ERL), the level at which there is a low probability of adverse effects, no remedial work is considered necessary based upon chemical

concentration.

If the sediment levels are above the ERL but below the ERM, then there is a possibility that the sediments may exhibit some adverse toxicological effect. Magnitude of the exceedence over the ERL must be considered as well as the relative difference between the Effects Range Low and the Effects Range Median. This is important because if the value is approaching the ERM (the concentration where effects are likely) then the likelihood of possible adverse effects increases. Bioassays should be performed to demonstrate whether or not the sediments are causing an adverse affect. For sediments where no toxicity is observed, then no additional remedial work is required based upon chemistry. Sediments for which toxicity or development bioassays show less than 80% normal development or survival, are identified as potential areas of concern and must considered for remedial activities.

If any chemical in the sediment is greater than its respective ERM, then it is likely that there will be adverse effects to the organisms that are exposed to these sediments. Unless a demonstration can be made through a series of biological tests that shows that the chemicals at this level are not causing adverse effects, then these areas are considered potential areas of concern.

This holds true for all constituents of concern with the exception of nickel. This is because nickel is 1) naturally occurring within the San Francisco Bay in excess of the ERM, 2) there is a very low confidence in the ERM for nickel, and 3) studies conducted within the San Francisco Bay have shown no toxicological effects at naturally occurring levels of nickel.

b) Identification by Biological Testing:

Biological testing is an important component when determining which areas may potentially have effects on the aquatic organisms which live within or may be exposed to the effected sediments. Bioassays give a direct indication of the toxicity that the sediments may have on the benthic community and aid in the development of a correlation between toxicity and chemical concentration. Unlike ordinary chemical testing, it takes into account synergistic and additive effects when multiple chemicals are present, as well as the bioavailability of the chemicals present. Therefore, any area that has been identified through bioassay testing that has less than 80% normal development or survival must be considered a potential area of concern and remediated appropriately.

c) Identification by Biomagnification/Bioaccumulation:

In addition to looking at the toxicological effects to the organisms that are directly exposed, bioaccumulation must also be examined. Because chemical contaminants such as PCBs, PNAs, and some metals are persistent, they tend to accumulate in the tissues of the organisms that are directly exposed. In addition, the organisms may then be eaten by predators, and the pollutants then work their way up the food chain. This is called biomagnification. It is therefore important to examine the direct chemical effects, as well as bioaccumulation and biomagnification even if toxicity is not observed. Currently for many chemicals there is little information pertaining to specific levels at which biomagnification occurs and how it affects the higher life forms. Effects of bioaccumulation can be very difficult to evaluate. Therefore, areas of concern based upon bioaccumulation must be developed on a site specific basis based upon modeling, direct measurement, or a combination of both until additional information becomes available. For sediments that are identified as having bioaccumulative impacts, then these areas are considered potential areas of concern.

Once an area has been identified as a potential area of concern based upon chemical concentration, observed toxicity, or bioaccumulation/biomagnification, the potential exposure pathways must be examined. This can usually be accomplished by examining the stratigraphic distribution of chemicals in the sediments. This distribution is an important component in determining the bioavailability of pollutants to the organisms and thus the potential for adverse effects to the exposed organisms as well as the biomagnification and exposure to other species which may feed on the organisms. The deeper the sediment contaminants, the lower the probability of exposure of the organisms since most of the organisms live within the oxic zone or shallow sediments. Therefore, after potential areas of concern have been identified based upon the three identification criteria above, if chemicals that are located in sediments are currently or may become available to the organisms, then these areas are considered areas of concern and must be remediated appropriately.

2. Cleanup / Containment Levels

Based upon the above screening protocol, any area identified as an area of concern must be considered for remedial activity. Remedial activity may not be necessary, if the sediment is significantly deep enough that it does not pose a threat to the organisms and it can be demonstrated that the sediment is in a depositional area so that the sediment will not become available in the future. These areas, although considered as areas of concern, may be considered as naturally capped, and may not need to be actively remediated. Long term

monitoring to demonstrate that the natural cap is an effective barrier to limit exposure of the aquatic environment and a residual management plan to minimize the disturbance of the cap may be necessary.

All areas that have been identified as areas of concern that are considered bioavailable, must be remediated to ambient levels. These levels are specified within the sediment cleanup standards in Table 4.1. The rationale for choosing ambient concentrations is that 1) ambient levels are considered technically and economically achievable, 2) ambient levels are considered protective of the beneficial uses, 3) ambient levels are below the sediment screening criteria for wetland creation as specified within the Basin Plan, and 4) as ambient concentrations are indicative of current sediment conditions, there is no fear that the clean imported cap material will be re-impacted by the surrounding sediments which are currently at ambient concentrations. It should be noted, that if it is demonstrated through site specific biological testing that the ambient concentrations are not protective of the aquatic species, then lower levels may be required.

Regional Board staff in conjunction with various resource agencies such as the Department of Fish and Game have been collecting sediment quality data over the past four years. This data has been collected through programs such as the Pilot Regional Monitoring Program, the Bay Protection and Toxic Cleanup Program, and the Regional Monitoring Program. One of the goals of these programs is to determine the ambient concentrations of various chemicals that exist within the bay. In order to accomplish this, sediment samples were collected from locations throughout the bay that were away from known source areas which are considered to be representative of ambient conditions. The sediment data was compiled, and a set of ambient values have been developed. Although the values are still considered preliminary, they do provide a good indication of the range of concentrations that can be expected within the bay sediments. These values will form the basis for the material to be used to cap the areas identified as areas of concern.

In addition to determining the contaminant distribution, it is very important to examine the hydrodynamics and sediment transport mechanisms within the area. If natural or manmade capping is to be an effective mechanism for limiting the risk and exposure of the organisms then a depositional environment is critical. If the site is characterized by an erosional environment, then capping is not an effective remedial technique and one must consider the resuspension of deeper sediments as they are redistributed into the water column through either wave or wind action.

13. **Future Changes to Cleanup Standards:** The goal of this remedial action is to restore the beneficial uses of groundwater underlying and the sediments adjacent to the

site. Results from other sites suggest that full restoration of beneficial uses to groundwater and sediments as a result of active remediation at this site may not be possible. If full restoration of beneficial uses is not technologically nor economically achievable within a reasonable period of time, then the discharger may request modification to the cleanup standards or establishment of a non-attainment area, a limited groundwater pollution zone where water quality objectives are exceeded. Conversely, if new technical information indicates that cleanup standards can be surpassed, the Board may decide if further cleanup actions should be taken. If modifications to the cleanup standards are contemplated that would increase risks to human health and safety or the environment, interested parties will be notified.

14. **Reuse or Disposal of Extracted Groundwater:** Board Resolution No. 88-160 allows discharges of extracted, treated groundwater from site cleanups to surface waters only if it has been demonstrated that neither reclamation nor discharge to the sanitary sewer is technically and economically feasible.
15. **Basis for 13304 Order:** The discharger has caused or permitted waste to be discharged or deposited where it is or probably will be discharged into waters of the State and creates or threatens to create a condition of pollution or nuisance.
16. **Cost Recovery:** Pursuant to California Water Code Section 13304, the discharger is hereby notified that the Board is entitled to, and may seek reimbursement for, all reasonable costs actually incurred by the Board to investigate unauthorized discharges of waste and to oversee cleanup of such waste, abatement of the effects thereof, or other remedial action, required by this order.
17. **CEQA:** This action is an order to enforce the laws and regulations administered by the Board. As such, this action is categorically exempt from the provisions of the California Environmental Quality Act (CEQA) pursuant to Section 15321 of the Resources Agency Guidelines.
18. **Notification:** The Board has notified the discharger and all interested agencies and persons of its intent under California Water Code Section 13304 to prescribe site cleanup requirements for the discharge, and has provided them with an opportunity to submit their written comments.
19. **Public Meeting:** Staff conducted a public meeting on June 25, 1996 to describe the project, answer questions, and receive comments from interested parties on the Order.
20. **Public Hearing:** The Board, at a public meeting, heard and considered all comments pertaining to this discharge.

IT IS HEREBY ORDERED, pursuant to Section 13304 of the California Water Code, that the discharger (or its agents, successors, or assigns) shall cleanup and abate the effects described in the above findings as follows:

A. PROHIBITIONS

1. The discharge of wastes or hazardous substances in a manner which will degrade water quality or adversely affect beneficial uses of waters of the State is prohibited.
2. Further significant migration of wastes or hazardous substances through subsurface transport to waters of the State is prohibited.
3. Activities associated with the subsurface investigation and cleanup which will cause significant adverse migration of wastes or hazardous substances are prohibited.

B. CLEANUP PLAN AND CLEANUP STANDARDS

1. **Implement Cleanup Plan:** The discharger shall implement the cleanup plan described in finding 11.
2. **Groundwater Cleanup Standards:** Current groundwater monitoring shows minimal groundwater pollution in either the Human Health Protection Zone or the Saltwater Ecological Protection Zone. However, a post remedial groundwater monitoring program will be required. If groundwater pollution is detected at that time, then the following groundwater cleanup standards shall be met in all wells within the SEPZ. In addition, if groundwater pollution is detected within the HHPZ, then a fate and transport study must be performed to determine groundwater concentrations in the HHPZ that will be protective of the SEPZ.

**Table 2.1: Saltwater Ecological Protection Zone
Groundwater Cleanup Standards**

Constituent	Cleanup Standard (ug/l)	Basis
Total Petroleum Hydrocarbons Diesel Range (TPH-d)	200	Ecological Protection based on Sea Urchin Elutriate Bioassays Performed at SFIA
Total Petroleum Hydrocarbons Motor Oil Range (TPH-mo)	To Be Determined*	Aquatic Species Protection
Benzene (B)	71	Basin Plan Shallow Effluent
Ethylbenzene (E)	43	10% U.S. EPA Marine Acute Criteria
Toluene (T)	5,000	U.S. EPA Marine Chronic Criteria
Xylene (X)	2,200	U.S. EPA Water Quality Criteria
Poly-chlorinated Biphenyls (Total PCBs)	0.000045	U.S. EPA Water Quality Criteria
Poly-Aromatic Hydrocarbons (Total PAHs or PNAs)	0.031	U.S. EPA Water Quality Criteria
Tetrachloroethylene (PCE)	6.9	California Water Quality Limit
Lead	5.6	California Water Quality Limit

* To be determined as part of the risk assessment as required per Task 1

3. **Soil Cleanup Standards:** Soil cleanup standards as listed in the following tables must be either remediated and/or treated in all on-site vadose-zone soils for the zone in which the pollution has been detected. The zone boundaries are identified on Figure 4.

Table 3.1a Human Health Protection Zone Standards
Soil Cleanup Standards

Constituent	Cleanup Standard (mg/kg)	Basis
Total Petroleum Hydrocarbons (TPH-d)	To Be Determined*	Risk Based
Total Petroleum Hydrocarbons (TPH-mo)	To Be Determined*	Risk Based
Benzene (B)	3.2	U.S. EPA Industrial PRG
Ethylbenzene (E)	690	U.S. EPA Industrial PRG
Toluene (T)	2,800	U.S. EPA Industrial PRG
Xylene (X)	990	U.S. EPA Industrial PRG
Poly-chlorinated Biphenyls (Total PCBs)	19	U.S. EPA Industrial PRG
Poly-Aromatic Hydrocarbons (Total PAHs or PNAs)	10	S.F. Bay - Water Quality Control Plan
Tetrachloroethylene (PCE)	1	S.F. Bay - Water Quality Control Plan
Lead	1,000	U.S. EPA Industrial PRG

* To be determined as part of a literature review or a site specific risk assessment as required per Task 1.

Table 3.1b: Human Health Protection Zone Standards
Soil Cap Standards

Constituent	Cleanup Standard (mg/kg)	Basis
Total Petroleum Hydrocarbons (TPH-d)	To Be Determined*	Risk Based
Total Petroleum Hydrocarbons (TPH-mo)	To Be Determined*	Risk Based
Benzene (B)	1.4	U.S. EPA Residential PRG
Ethylbenzene (E)	690	U.S. EPA Residential PRG
Toluene (T)	1,900	U.S. EPA Residential PRG
Xylene (X)	990	U.S. EPA Residential PRG
Poly-chlorinated Biphenyls (Total PCBs)	1.4	U.S. EPA Residential PRG
Poly-Aromatic Hydrocarbons (Total PAHs or PNAs)	10	S. F. Bay - Water Quality Control Plan
Tetrachloroethylene (PCE)	1	S. F. Bay -Water Quality Control Plan
Lead	130	U.S. EPA Residential PRG (Mod. for Calif.)

* To be determined as part of a literature review or a site specific risk assessment as required per Task 1.

Table 3.2: Saltwater Ecological Protection Zone Standards
Soil Cleanup Standards

Constituent	Cleanup Standard (mg/kg)	Basis
Total Petroleum Hydrocarbons Diesel Range (TPH-d)	86	Ecological Protection based on Bioassays on Bay Mussel at SFIA
Total Petroleum Hydrocarbons Motor Oil Range (TPH-mo)	To Be Determined*	Protection of S.F.Bay Via Groundwater Migration Based On US EPA OLM Model
Benzene (B)	2.7	Protection of S.F.Bay Via Groundwater Migration Based On US EPA OLM Model
Ethylbenzene (E)	5	Protection of S.F.Bay Via Groundwater Migration Based On US EPA OLM Model
Toluene (T)	2,700	Protection of S.F.Bay Via Groundwater Migration Based On US EPA OLM Model
Xylene (X)	990	Protection of S.F.Bay Via Groundwater Migration Based On US EPA OLM Model
Poly-chlorinated Biphenyls (Total PCBs)	0.05	Best Professional Judgement Ecological Protection Based upon Bioaccumulation
Poly-Aromatic Hydrocarbons (Total PAHs or PNAs)	10	S. F. Bay Water Quality Control Plan

Constituent	Cleanup Standard (mg/kg)	Basis
Tetrachloroethylene (PCE)	0.3	Protection of S.F.Bay Via Groundwater Migration Based On US EPA OLM Model
Lead	35	Protection of S.F.Bay Via Groundwater Migration Based On TCLP Data

* To be determined as part of the risk assessment as required per Task 1

4. **Sediment Cleanup Levels:** Based on the areas of concern as identified by the methodology within Finding 12e, the sediments must be remediated and or capped with clean sediment to the San Francisco Bay Ambient Levels as identified below:

Table 4.1: Sediment Cleanup Levels

Constituent	Cleanup Standard (mg/kg)	Basis
Total Petroleum Hydrocarbons (TPH)	86	Ecological Protection based on Bioassays Performed at SFIA
Poly-chlorinated Biphenyls (Total PCBs)	0.01	Based upon Bioaccumulation Studies/ Model
Poly-Aromatic Hydrocarbons (Total Heavy PAHs)	5.13	S. F. Bay Ambient Concentration
Arsenic (As)	16.1	S. F. Bay Ambient Concentration
Cadmium (Cd)	0.4	S. F. Bay Ambient Concentration
Chromium (Cr)	212	S. F. Bay Ambient Concentration
Copper (Cu)	63	S. F. Bay Ambient Concentration

Constituent	Cleanup Standard (mg/kg)	Basis
Lead (Pb)	35	S. F. Bay Ambient Concentration
Mercury (Hg)	0.41	S. F. Bay Ambient Concentration
Nickel (Ni)	115	S. F. Bay Ambient Concentration
Selenium (Se)	1.0	S. F. Bay Ambient Concentration
Silver (Ag)	0.56	S. F. Bay Ambient Concentration
Zinc (Z)	156	S. F. Bay Ambient Concentration

C. TASKS

1. HEALTH RISK ASSESSMENT AND HEALTH AND SAFETY PLAN

COMPLIANCE DATE: August 2, 1996

Submit either 1) a health risk assessment or 2) a comprehensive health and safety plan to the Executive Officer for the remediation and management of the soil, groundwater, and sediments to ensure adequate protection of on and off site receptors during and after remedial activities.

Option 1: A site specific health risk assessment must be completed prior to the approval of a remedy for the site and prior to initiation of remediation or construction activities at the site. The site specific risk assessment must evaluate: 1) whether an exposure pathway exists; and if such an exposure pathway exists then , 2) the quantitative risks to human health and safety, including human health considerations with the potential of affecting the offsite receptors. The site specific risk assessment must separately analyze risk in relation to remediation and construction activities, post construction surface conditions (i.e. filled or paved surfaces and shallow subsurfaces), and post construction residual pollutants that will remain onsite after the completion of the preliminary remedial action plan described within Findings 10 and 11 of this Order.

Compliance with Preliminary Remediation Goals (PRGs) for industrial areas shall not be deemed a satisfactory method of completing the required risk assessment for remediation and construction activities, post construction surface conditions (i.e. 2 to 3 foot of clean fill material), or post construction residual pollution conditions with a potential to migrate through the cap (i.e. volatile organic compounds). Compliance with PRGs for residential areas (as adjusted for California) shall be deemed to be a satisfactory method of completing the required risk assessment for post construction surface conditions (i.e. the clean fill materials) and post construction residual pollution conditions with the potential to migrate through the cap (i.e. volatile organic compounds).

Option 2: In lieu of preparing a risk assessment for remediation and construction activities the Discharger may prepare a comprehensive health and safety plan for construction activities that meet the following substantive criteria by ensuring that there is: 1) no offsite migration of pollutants (including but not limited to airborne dust) during remedial construction activities as defined in the monitoring program within the approved health and safety plan; 2) a monitoring system with high volume sampling equipment, capable of detecting low levels of metals and particulate matter, for ensuring compliance with the no offsite migration requirements; and 3) a contingency plan, including notification and corrective action requirements, in the event offsite migration occurs notwithstanding these health and safety plan measures.

Compliance with Preliminary Remediation Goals (PRGs) for industrial areas shall not be deemed a satisfactory method of completing the required risk assessment for remediation and construction activities, post construction surface conditions (i.e. 2 to 3 foot of clean fill material), or post construction residual pollution conditions with a potential to migrate through the cap (i.e. volatile organic compounds). Compliance with PRGs for residential areas (as adjusted for California) shall be deemed to be a satisfactory method of completing the required risk assessment for post construction surface conditions (i.e. the clean fill materials) and post construction residual pollution conditions with the potential to migrate through the cap (i.e. volatile organic compounds).

For either the risk assessment or the health and safety plan, the following procedure must be utilized: 1) interested parties must be consulted in preparing drafts of the risk assessment, health and safety plan, and contingency plan; 2) a completed draft risk assessment and health and safety plan must be made available for additional review and comment by interested parties; and 3) final remedy approval and site construction activities may not occur until after final approval of the risk assessment and health and safety plan by the Executive

Officer.

For comparison, the Board considers the following risks to be acceptable at remediation sites: a cumulative hazard index of 1.0 or less for non-carcinogens, an excess individual chemical cancer risk of not greater than 10^{-5} , and a cumulative excess cancer risk of 10^{-4} or less for carcinogens for most sites and an excess individual chemical cancer risk of not greater than 10^{-6} , and a cumulative excess cancer risk of 10^{-5} or less for carcinogens at highly sensitive receptor locations such as child care facilities.

2. **WORKPLAN FOR FINAL REMEDIATION SYSTEM DESIGN AND ASSOCIATED IMPLEMENTATION ACTIVITIES**

COMPLIANCE DATE: September 3, 1996

Submit a proposed remedial action plan and proposed institutional controls, including the text of a proposed deed restriction and other components as described in Finding 9.c and acceptable to the Executive Officer for the remediation and management of the soil, groundwater, and sediments. The proposed plan must describe all areas of concern and appropriate remedial activities in order to meet the levels as specified above which will a) achieve the environmental protection cleanup levels for sediment; b) achieve the levels needed to protect human health; and c) comply with the approved health and safety plan. Prior to final approval of the remedial action plan, a complete proposed plan and proposed institutional controls will be made available for review and comment by interested parties. The final remedial action plan must include recommended levels for both soil and groundwater within the Human Health Protection Zone that are protective of human health and the environment. In the event the discharger opts not to perform a site specific risk assessment, the U.S. EPA PRGs will remain as the applicable levels for the Human Health Protection Zone as specified within Tables 3.1a and 3.1b. A site remediation health and safety plan will be prepared for approval by the Executive Officer documenting the steps to be taken during site remediation to protect human health.

- a. Onsite Soils: Final design specifications for on site soil remediation must be included such as volume of soil to be stabilized, soil stabilization technique (including bench scale testing), placement of treated soil, confirmation sampling plan, appropriate air monitoring during excavation of soils, dust control measures, and groundwater

effectiveness of the soil stabilization treatment. It should include all new monitoring well locations, sampling schedule, and parameters to be monitored. The report should document the results of the sediment treatment effectiveness in reducing sediment toxicity, and that biomagnification has been adequately remediated, as well as cap monitoring. Proposals for any additional groundwater or sediment remedial actions based upon the post remedial monitoring must be included in annual reports.

4. **PROPOSED INSTITUTIONAL CONSTRAINTS**

COMPLIANCE DATE: September 16, 1997

Submit a technical report acceptable to the Executive Officer documenting procedures to be used by the discharger to prevent long term human exposure to soil pollution and marine exposure to polluted sediment. Such procedures shall consider the use of a deed restriction preserving the offshore sediment cap, the onshore fill over contaminated soil, and the wetland built over the turning basin, and prohibiting the use of shallow groundwater as a source of drinking water.

5. **IMPLEMENTATION OF INSTITUTIONAL CONSTRAINTS**

COMPLIANCE DATE: 60 days after Executive Officer approval

Submit a technical report acceptable to the Executive Officer documenting that the proposed institutional constraints have been implemented.

6. **FIVE-YEAR STATUS REPORT**

COMPLIANCE DATE: March 16, 2002

Submit a technical report acceptable to the Executive Officer evaluating the effectiveness of the approved cleanup plan. The report should include:

- a. Summary of effectiveness in controlling contaminant migration and protecting human health and the environment
- b. Comparison of contaminant concentration trends with cleanup standards
- c. Comparison of anticipated versus actual costs of cleanup activities
- d. Performance data (e.g. soil stabilization, post groundwater monitoring, effectiveness of sediment containment)
- e. Cost effectiveness data (e.g. cost per pound of contaminant removed)

- f. Summary of additional investigations (including results) and significant modifications to remediation systems
- g. Additional remedial actions proposed to meet cleanup standards (if applicable) including time schedule

If cleanup standards have not been met and are not projected to be met within a reasonable time, the report should assess the technical practicability of meeting cleanup standards and may propose an alternative cleanup strategy.

7. PROPOSED CURTAILMENT

COMPLIANCE DATE: 60 days prior to proposed curtailment

Submit a technical report acceptable to the Executive Officer containing a proposal to curtail remediation. Curtailment includes monitoring system closure (e.g. monitoring well abandonment), monitoring system suspension (e.g. cease monitoring of the thickness of the sediment cap and wetland, cease monitoring groundwater), and significant system modification (e.g. major change in wetland area, major modification in groundwater monitoring program). The report should include the rationale for curtailment. Proposals for final closure should demonstrate that cleanup standards have been met, pollutant concentrations are stable, and contaminant migration potential is minimal.

8. IMPLEMENTATION OF CURTAILMENT

COMPLIANCE DATE: 60 days after Executive Officer approval

Submit a technical report acceptable to the Executive Officer documenting completion of the tasks identified in Task 8.

9. EVALUATION OF NEW TECHNICAL INFORMATION

COMPLIANCE DATE: 90 days after requested
by Executive Officer

Submit a technical report acceptable to the Executive Officer evaluating new technical information which bears on the approved cleanup plan and cleanup standards for this site. In the case of a new cleanup technology, the report should evaluate the technology using the same criteria used in the feasibility study. Such technical reports shall not be requested unless the Executive

Officer determines that the new information is reasonably likely to warrant a revision in the approved cleanup plan or cleanup standards.

10. **Delayed Compliance:** If the discharger is delayed, interrupted, or prevented from meeting one or more of the completion dates specified for the above tasks, the discharger shall promptly notify the Executive Officer and the Board may consider revision to this Order following notification of interested parties.

D. PROVISIONS

1. **No Nuisance:** The storage, handling, treatment, or disposal of polluted soil or groundwater shall not create a nuisance as defined in California Water Code Section 13050(m).
2. **Good O&M:** The discharger shall maintain in good working order and operate as efficiently as possible any facility or control system installed to achieve compliance with the requirements of this Order.
3. **Cost Recovery:** The discharger shall be liable, pursuant to California Water Code Section 13304, to the Board for all reasonable costs actually incurred by the Board to investigate unauthorized discharges of waste and to oversee cleanup of such waste, abatement of the effects thereof, or other remedial action, required by this Order. If the site addressed by this Order is enrolled in a State Board-managed reimbursement program, reimbursement shall be made pursuant to this Order and according to the procedures established in that program. Any disputes raised by the discharger over reimbursement amounts or methods used in that program shall be consistent with the dispute resolution procedures for that program.
4. **Access to Site and Records:** In accordance with California Water Code Section 13267(c), the discharger shall permit the Board or its authorized representative:
 - a. Entry upon premises in which any pollution source exists, or may potentially exist, or in which any required records are kept, which are relevant to this Order.
 - b. Access to copy any records required to be kept under the requirements of this Order.
 - c. Inspection of any monitoring or remediation facilities installed in

response to this Order.

- d. Sampling of any groundwater or soil which is accessible, or may become accessible, as part of any investigation or remedial action program undertaken by the discharger.
 5. **Self-Monitoring Program:** The discharger shall comply with the Self-Monitoring Program as required by this Order and as may be amended by the Executive Officer.
 6. **Contractor / Consultant Qualifications:** All technical documents shall be signed by and stamped with the seal of a California registered geologist, a California certified engineering geologist, or a California registered civil engineer.
 7. **Lab Qualifications:** All samples shall be analyzed by State-certified laboratories or laboratories accepted by the Board using approved EPA methods for the type of analysis to be performed. All laboratories shall maintain quality assurance/quality control (QA/QC) records for Board review. This provision does not apply to analyses that can only reasonably be performed on-site (e.g. temperature).
 8. **Document Distribution:** Copies of all correspondence, technical reports, and other documents pertaining to compliance with this Order shall be provided to the following agencies:
 - a. City of South San Francisco
Economic Development/Redevelopment Project Management Attn:
Robert Beyer
 - b. County of San Mateo
Office of Environmental Health
Attn: Elizabeth Rouan
 - c. Department of Toxic Substances Control
Attn: Dick Jones
- The Executive Officer may modify this distribution list as needed.
9. **Reporting of Changed Owner or Operator:** The discharger shall file a technical report on any changes in site occupancy or ownership associated with the property described in this Order.

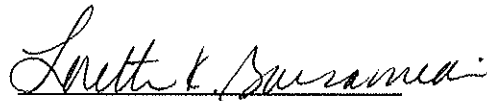
10. **Reporting of Hazardous Substance Release:** If any hazardous substance is discharged in or on any waters of the State, or discharged or deposited where it is, or probably will be, discharged in or on any waters of the State, the discharger shall report such discharge to the Regional Board by calling (510) 286-1255 during regular office hours (Monday through Friday, 8:00 to 5:00).

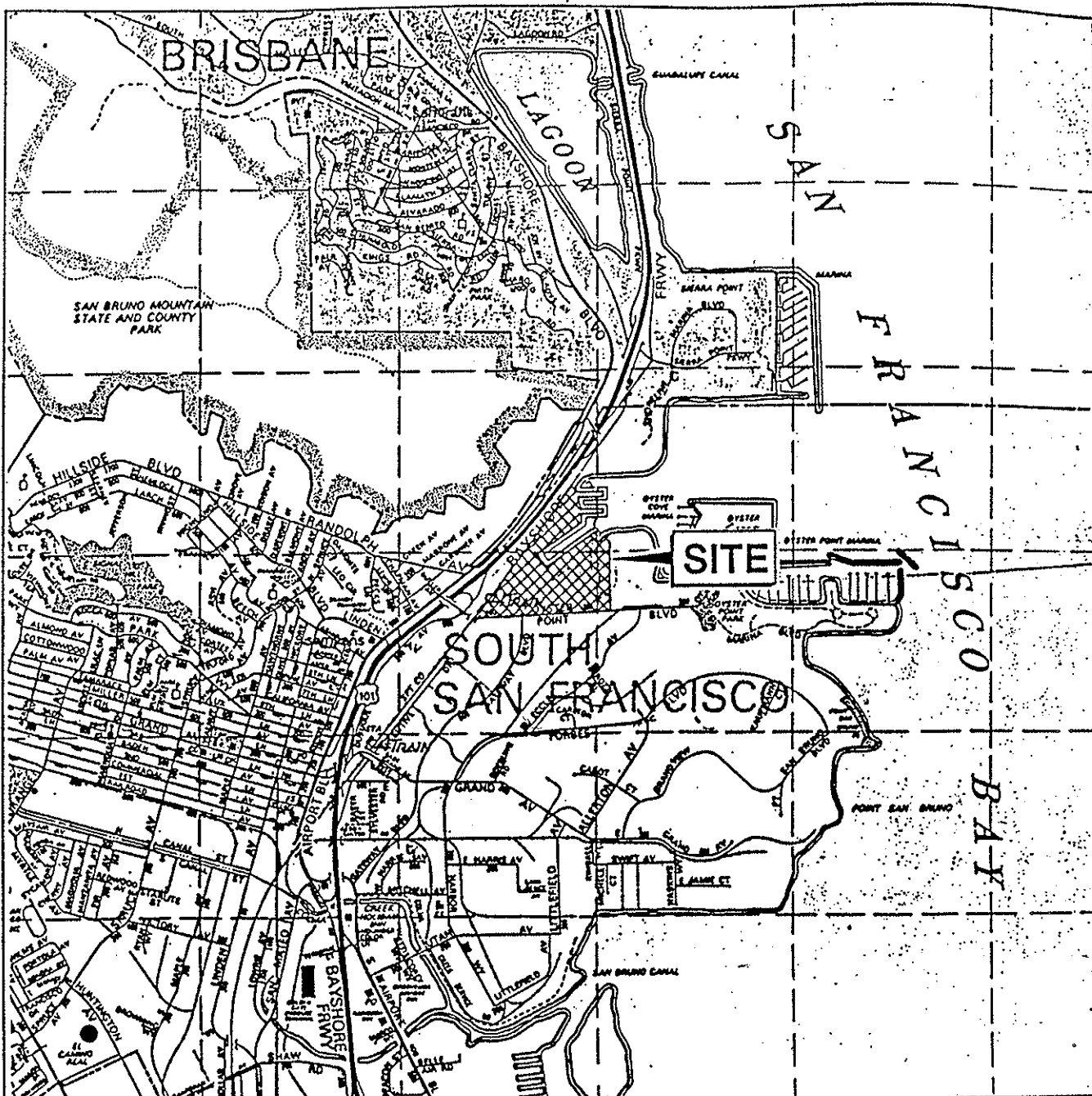
A written report shall be filed with the Board within five working days. The report shall describe: the nature of the hazardous substance, estimated quantity involved, duration of incident, cause of release, estimated size of affected area, nature of effect, corrective actions taken or planned, schedule of corrective actions planned, and persons/agencies notified.

This reporting is in addition to reporting to the Office of Emergency Services required pursuant to the Health and Safety Code.

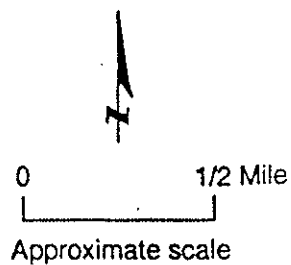
11. **Secondarily-Responsible Discharger:** Within 60 days after being notified by the Executive Officer that other named dischargers have failed to comply with this order, U.S.X. Corporation as the primary discharger shall then be responsible for complying with this order.
12. **Periodic SCR Review:** The Board will review this Order periodically and may revise it when necessary.

I, Loretta K. Barsamian, Executive Officer, do hereby certify that the foregoing is a full, true, and correct copy of an Order adopted by the California Regional Water Quality Control Board, San Francisco Bay Region, on July 17, 1996.


Loretta K. Barsamian
Executive Officer



Base map: The Thomas Guide
San Mateo County
1993

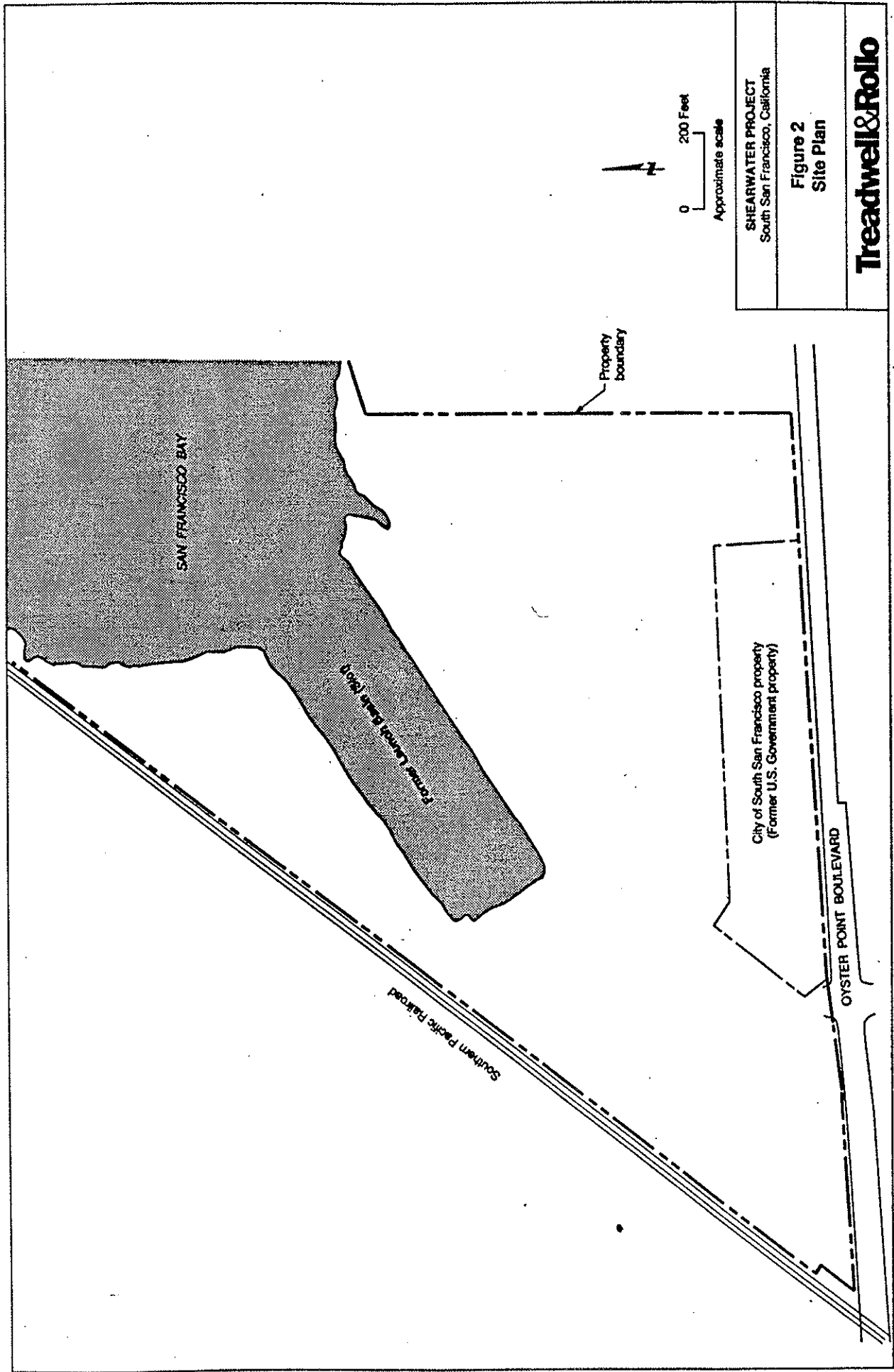


SHEARWATER PROJECT
South San Francisco, California

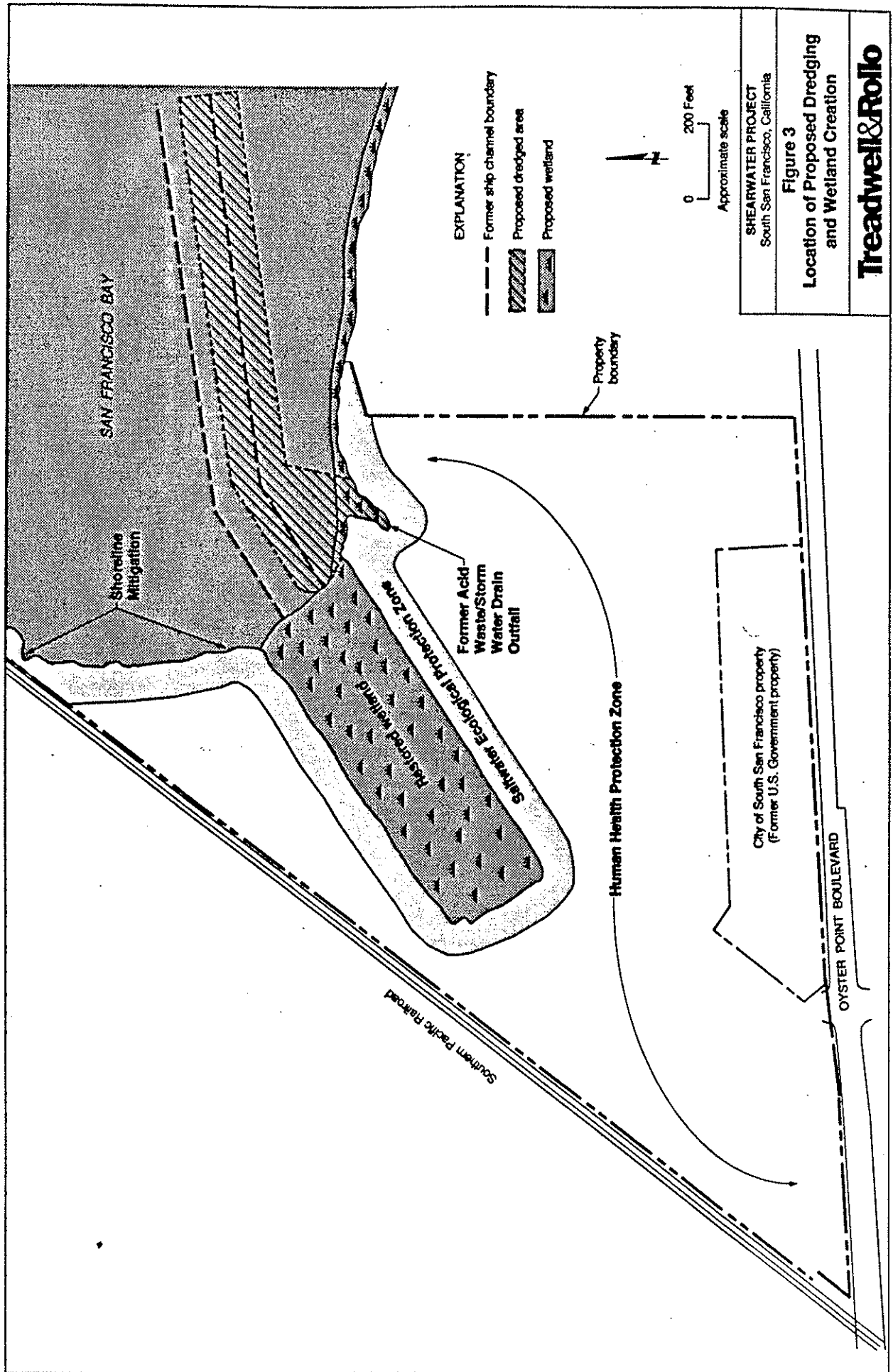
Treadwell&Rollo

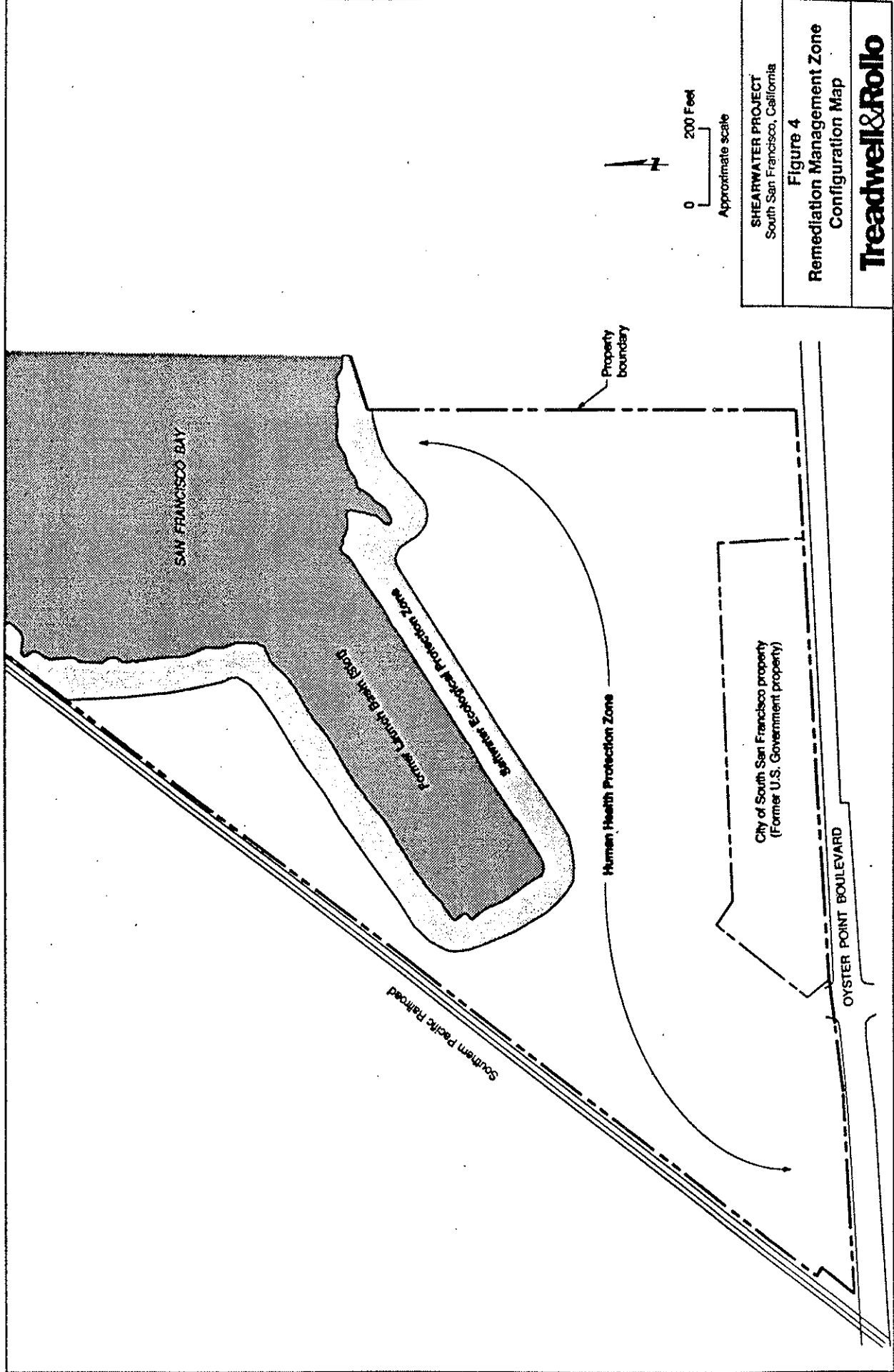
Figure 1:
SITE LOCATION MAP

Project No. 1828.01



Treadwell & Rollo





SHEARWATER PROJECT
South San Francisco, California

Figure 4
Remediation Management Zone
Configuration Map

Treadwell & Rollo